

REMARKS

Reconsideration of the above-referenced application in view of the following remarks is respectfully requested.

Claims 1-6 are pending in this case. Claims 1, 2, and 4-6 have been amended herein.

The Declaration was objected to as being defective because the signature and date of signing of inventor Philip B. Simon was missing from the original Declaration. In response, Applicant has attached a new Declaration signed by Mr. Simon on 4 September 1999.

The drawings were objected to as lacking an indication of element 20 described on page 7, at line 2 of the specification, as well as the following reference numbers not mentioned in the specification: 10, and 12a and c. Applicant has attached a proposed modification in red ink for Figure 1. Element 10 has been removed from that figure as it is not mentioned in the specification. The specification has been amended to include references to elements 20, 10, 12a, and c.

Claims 1 and 5 were objected to with regard to the phrase "with tape providing." The claims have been amended in response to this objection.

Claims 1-6 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, Claims 1 and 5 were rejected because the limitation "the lead frame strap" lacked sufficient antecedent basis. Claims 1 and 5 have been amended in response to the rejection to remove the "lead frame strap" limitation.

Claims 1-6 were rejected under 35 U.S.C. 102(b) as being anticipated by Ootsuki, et al. (U.S. 5,652,461). Claims 1 and 5, as amended, include the feature of "a plurality of lead frame leads evenly distributed around a semiconductor die mount area." Ootsuki does not teach or suggest such a feature. For example, in Figure 2B, Ootsuki's lead frame leads 1 are arranged in groups along the sides of the semiconductor die, i.e. there are five leads along each of the longer sides of the rectangular die and three leads along each of the shorter sides. Those leads are arranged in distinct groups, and are not evenly distributed around the semiconductor die mount as required by Claims 1 and 5 and around the four sides and corners of the die as required by Claim 2. The same is true of Ootsuki's Figures 5, 9B, 10B, 11B, 12B, and 16B. Therefore, Applicant submits that Claims 1 and 5, as well as Claims 2-4 and 6 depending therefrom, are patentable in view of Ootsuki.

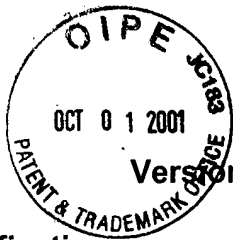
In view of the above, Applicant respectfully requests withdrawal of the Examiner's rejections and allowance of claims 1-6. If the Examiner has any questions or other correspondence regarding this application, Applicant requests that the Examiner contact Applicant's attorney at the below listed telephone number and address.

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Respectfully submitted,



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Version with Markings to Show Changes Made

Specification

Paragraph at Page 4, line 11

The lead frame of FIG. 1a presents a greater problem in that the semiconductor die to be mounted in the lead frame on die mount 12a is rectangular with a greater number of leads on, for example, side a than on smaller size side b.

Paragraph at Page 6, line 7

FIG. 4a is an enlarged view of a portion of FIG. 4 clearly showing the improved spacing of the bond wires 23a and 23b. When compared with the spacing of bond wires 17a and 17b of FIG. 3 and FIG. 3a, the improvement of the lead frame leads spacing and the bond wire spacing of the lead frame without the tie strap is clearly seen. Bond wires 23a and 23b are from lead frame leads from one side of the lead frame that extend to bond pads on the adjacent side, or from lead frame leads that are in the space where the tie strap has been removed. As illustrated, leads 23a and 23b would be attached to bond pads on side c of semiconductor die 21 if die 21 were square. However, since die 21 is rectangular, leads 23a and 23b extend to side d of die 21. If there were tie bars on the lead frame, this would not be possible since leads 23a and 23b would cross over the tie bar.

Paragraph at Page 6, line 22 (i.e. last paragraph on page 6).

Since there are no tie bars to hold a die mount pad in place, in this embodiment, the semiconductor die is supported by a heat slug 30 which is taped under the lead frame. Heat slug 30 is taped to leads 20 [lead 20s] and serves as both a heat sink and a die mount pad.

Claims

1. A strapless lead frame/heat slug combination, comprising:
 - a plurality of lead frame leads evenly distributed around a semiconductor die mount area [, and extending into the area normally occupied by the lead frame strap]; and
 - a heat slug providing the die mount area, wherein said heat slug is attached under the lead frame with tape [providing the die mount area].
2. The strapless lead frame according to Claim 1, wherein the semiconductor die has four sides and corners, and the lead frame leads are evenly distributed on each of the four sides and around the corners.
4. The strapless lead frame according to Claim 1, wherein [where in] said semiconductor die has a different number of bond pads on adjacent sides, and at least one of said bond pads is attached to a bond wire attached to a lead frame lead on a side of the lead frame adjacent to the side of the semiconductor die on which [with] the bond pad is located.
5. A strapless lead frame for use with heat slug packages, comprising:
 - a plurality of lead frame leads evenly distributed around a semiconductor die mount area [, and extending into the area normally occupied by the lead frame strap]; and
 - a heat slug providing a rectangular die mount area, wherein said heat slug is attached under the lead frame with tape [providing a rectangular die mount area], there being the same number of lead frame leads on opposites sides of the lead frame and a different number of lead frame leads on adjacent sides of the lead frame.

6. The strapless lead frame according to Claim 5, including a semiconductor die with a different number of bond pads on adjacent sides and the same number of bond pads on opposite sides, and at least one of said bond pads is attached to a bond wire attached to a lead frame lead on a side of the lead frame adjacent to the side of the semiconductor die on which [with] the bond pad is located.